

IN THE SPECIFICATION

Page 1, between the title of the invention and the first line of the text, insert the following:

CROSS-REFERENCE TO RELATED APPLICATION

This Application is a Section 371 National Stage Application of International Application No. PCT/FR2004/000955, filed April 16, 2004 and published as WO 2004/095783 on November 4, 2004, not in English.

FIELD OF INVENTION

Page 1, after line 15, insert the following heading:

BACKGROUND OF THE INVENTION

Please replace the paragraph appearing on page 1, lines 6-11 with the following amended paragraph:

More specifically, an embodiment of the invention concerns a method for controlling data packet traffic at the input of a network when the traffic comprises a plurality of streams and/or sub-streams each associated with a priority level, and/or each of the packets is marked with the priority level associated with the stream or sub-stream to which this packet belongs. In other words, the invention concerns a network mechanism used to optimise the flow of traffic entering a network.

Page 8, after line 13, insert the following heading:

SUMMARY OF THE INVENTION

Please replace the paragraphs beginning on page 8, line 14, to page 9, line 13 with the following amended paragraphs:

~~The~~An embodiment of the invention is aimed especially at overcoming these drawbacks of the prior art and providing an optimal solution in the event of congestion of the network.

More specifically, one of the goals of an embodiment of the

present invention is to provide a method and device for traffic control that can be used to control bursts and smooth traffic on a set of streams and/or sub-streams associated with priority levels.

In other words, it is a goal of an embodiment of the present invention to provide a method and a device of traffic control to protect important information from bursts, in order to provide a solution to the contradiction between the optimisation of a stream (for example a video stream) containing bursts and a smoothing of the bursts for quality transport in the network.

It is also a goal of an embodiment of the invention to provide a method and device of this kind that are simple to implement and cost little.

It is another goal of an embodiment of the invention to provide such a method and device making it possible to efficiently propose traffic contracts (SLA/SLS) between network operators and service providers.

~~These different goals, as well as others that shall appear here below, are achieved according to~~ One embodiment of the invention by means of relates to a method of controlling data packet traffic at the input of a network, the traffic comprising N streams and/or sub-streams which are each associated with a priority level, N ≥ 2 , each of the packets being marked with the priority level associated with the stream or sub-stream to which said packet belongs, said method comprising a step for implementing a token bucket mechanism with N operating levels with N token buffers, each containing a number of available tokens, the tokens of each of the N token buffers being used to process one of the N priority levels, each of the packets being accepted or rejected depending on whether or not it is possible for tokens to be assigned to it depending on the tokens available at least in the token buffer used to process the priority level of said packet.

The general principle of an embodiment of the invention therefore ~~consists in using~~ uses a multi-layer token bucket (MLTB) to reject the packets outside a profile that is required and

characterized by the N levels of operation of the multi-layer token bucket. Each packet undergoes processing according to a marking corresponding to its priority level. The accepted packets are placed in a queue.

Please replace the paragraph beginning on page 9, line 31 to page 10, line 2 with the following amended paragraph:

~~The~~An embodiment of the invention therefore permits the processing of bursts at the levels having the highest priority, because, for each priority level, there is an available reserve to cope with any sudden arrival of a set of data that should not be rejected.

Please replace the paragraphs appearing on page 10, lines 7-23 with the following amended paragraphs:

It will be noted that an embodiment of the present invention is totally compatible with unicast and multicast IP streams.

It will also be noted that an embodiment of the present invention enables the transmission, in a same class of service, of several groups of streams with different priorities. In particular, an embodiment of the invention makes it possible to provide processing adapted to a video stream or group of video streams (IPB or hierarchical) in compliance with a contractualized traffic profile (SLS) by characteristic values of the token bucket type. Indeed, the easily measurable and adaptable parameters of a multi-layer token bucket (MLTB) are an efficient means of proposing (SLA/SLS) traffic contracts between network operators and service providers. The presence of priority information leads to the specifications of this bucket. The numerous variations of this bucket are a means of offering service classes adapted to the requirements of the clients. Whatever the applications, the traffic profile brings into play the main elements of characterisation of a stream in a network: the bit rate and the time limit. ~~The~~An embodiment of the

invention is therefore a means of defining a contract with a compromise negotiated between the bit rate, the size of the bursts and the transmission time.

Please replace the paragraphs appearing on page 13, lines 9-21 with the following amended paragraphs:

~~The invention also~~ A further embodiment of the invention relates to a computer program comprising program code instructions for the execution of the steps of the method as described here above, when said program is executed on a computer.

~~The invention also~~ A further embodiment of the invention relates to a device for controlling data packet traffic at the input of a network, the traffic comprising N streams and/or sub-streams which are each associated with a priority level, N ≥ 2 , each of the packets being marked with the priority level associated with the stream or sub-stream to which said packet belongs, said device comprising means for implementing a token bucket mechanism with N operating levels with N token buffers, each containing a number of available tokens, the tokens of each of the N token buffers being used to process one of the N priority levels, each of the packets being accepted or rejected depending on whether or not it is possible for tokens to be assigned to it depending on the tokens available at least in the token buffer used to process the priority level of said packet.

Please replace the paragraph appearing on page 13, lines 29-31 with the following amended paragraphs:

~~The invention also~~ A further embodiment of the invention relates to a piece of network equipment comprising a control device as mentioned here above, said network equipment belonging to the group comprising:

Please replace the paragraph appearing on page 14, lines 6-8 with the following amended paragraph:

Other features and advantages of one or more embodiments of the invention shall appear from the following description of a preferred embodiment of the invention, given by way of an indicative and non-restrictive example, and from the appended drawings, ~~of which~~.

Page 14, after line 8, insert the following heading:

BRIEF DESCRIPTION OF THE DRAWINGS

Page 14, after line 21, insert the following heading:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please replace the paragraphs beginning on page 14, line 22, to page 15, line 5 with the following amended paragraphs:

~~The~~One embodiment of invention therefore relates to a method of controlling data packet traffic at the input of a network. The traffic is of the type comprising N streams and/or sub-streams which are each associated with a priority level, N 2. Each of the packets is marked with the priority level associated with the stream or sub-stream to which it belongs.

For example, the ~~invention~~embodiment enables the transmission, as a priority, of the essential information of a video stream or of several video streams grouped together in an aggregate. Depending on the nature of the stream, this distinction is possible for example either by IBP type images (see definition above), or by the n layers of a hierarchical stream. While, in the former case, the mean bit rate of the images I remains low as compared with the overall bit rate, in the latter case, the information that is most important and needs the maximum protection is defined by the fraction of the overall bit rate occupied by the basic layer, and capable of representing up to 50% of the stream. In general, the basic layer is the only

one to contain reference information contained in the images I.

Please replace the paragraph beginning on page 15, lines 9-10 with the following amended paragraph:

Referring now to figure 1, an example is given of a network architecture in which the traffic control method according to one embodiment of the invention can be implemented.

Please replace the paragraphs beginning on page 15, line 30 to page 16, line 8 with the following amended paragraphs:

~~The method of the invention~~In one embodiment, the method is implemented in a piece of network equipment forming a traffic conditioner for entry into the IP network 1. This piece of network equipment may be located between the network of the service provider 3, 4 and the IP network 1:

- either in one of the pieces of edge equipment 8, 9 of the service provider networks 3 and 4;
- or in the edge router 2₁ of the IP network 1.

The network equipment implementing the method of an embodiment of the invention may also be any router placed at a congestion point in the network (especially for any access to an ADSL link).